DOCUMENT RESUME

ED 027 077 PS 001 556

By-Nimnicht, Glen; And Others

Research on the New Nursery School. Part II: A Report on the Use of Typewriters and Related Equipment with Three- and Four-Year-Old Children at the New Nursery School. Interim Report.

Colorado State College, Greeley.
Pub Date Dec 67
Note-23p.
EDRS Price MF-$0.25 HC-$1.25
Descriptors-*Culturally Disadvantaged, Educational Equipment, *Experimental Programs, Language Skills, Mexican Americans, *Nursery Schools, Preschool Children, Preschool Programs, *Program Evaluation, *Self Reward, Student Motivation, Typewriting
Identifiers-Autotelic Responsive Environment, Metropolitan Reading Readiness Test, Stanford Binet

In an attempt to improve the readiness of 3- and 4-year-old disadvantaged Mexican-American children, the New Nursery School was developed in Greeley, Colorado. The activities are autotelic; that is, the child does something for its own sake rather than for the sake of obtaining rewards or avoiding punishments that have no inherent connection with the activity itself. One of the activities available is the typing booth. If the child wishes, he can play with an electric typewriter. This activity is structured to subtly lead the participant through several levels of achievement with respect to language development: (1) free exploration, (2) matching upper case letters on a card and on the typewriter, (3) matching upper and lower case letters, (4) typing words, and (5) dictating stories. The children's performance on the typewriter and on subsequent achievement tests indicates that (1) there is a relationship between the number of times the child goes into the booth, the amount of time spent therein, and achievement on the booth activities, (2) the booth experience is of little value to the 3-year-olds, (3) children with low IQ scores are least likely to be high achievers in the booth, and (4) the children with high booth achievement were the most benefited in language development. (WD)

EDO 27047

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

INTERIM REPORT: RESEARCH ON THE NEW NURSERY SCHOOL

PART II: *A Report on the Use of Typewriters and Related Eqauipment With Three- and Four-Year-Old Children at the New Nursery School*

December, 1967

Glen Nimnicht
John Meier
Oralie McAfee

COLORADO STATE COLLEGE
Greeley, Colorado

ED 027047

TABLE OF CONTENTS

PAGE

PART II: *A Report on the Use of Typewriters and Related Equipment With Three- and Four-Year-Old Children at the New Nursery School*

Introduction ---------- 44

Activities in the Typing Booths ---------- 45

Problems in Evaluation ---------- 49

Data Collected ---------- 50

Analysis of the Data ---------- 51

Discussion ---------- 60

Part II:

Table I -- BOOTH ACHIEVEMENT OF NEW NURSERY SCHOOL CHILDREN OVER A THREE YEAR PERIOD ---------- 52

Table II -- CORRELATIONS ON BOOTH DATA FOR NNS (1966-67)---- 53

Table III -- CORRELATIONS ON BOOTH DATA FOR REN (1966-67)---- 53

Table IV -- THE RELATIONSHIP OF AGE AND ACHIEVEMENT IN THE TYPING BOOTHS ---------- 54

Table V -- THE RELATIONSHIP OF I.Q. TEST SCORES ON THE STANFORD-BINET AND LEVELS OF ACHIEVEMENT IN THE TYPING BOOTHS ---------- 55

Table VI -- THE DISTRIBUTION OF I.Q. SCORES ON THE STANFORD-BINET FOR HIGH (PHASE IV OR >) AND LOW (PHASE III OR <) BOOTH ACHIEVERS ---------- 57

Page

Table VII -- COMPARISON OF TEST SCORES ON METROPOLITAN READING READINESS TEST FOR CHILDREN WITH HIGH ACHIEVEMENT AND LOW ACHIEVEMENT IN TYPING BOOTHS ---------- 59

Table VIII-- THE DISTRIBUTION OF TEST SCORES ON THE "C" TEST FOR HIGH AND LOW ACHIEVERS IN THE TYPING BOOTHS-- 61

Table IX -- HIGH AND LOW ACHIEVING REN CHILDREN ---------- 62

Table X -- THE BOOTH ACHIEVEMENT OF NNS AND REN CHILDREN AT THE END OF THE SCHOOL YEAR 1966-67 ---------- 63

A REPORT ON THE USE OF TYPEWRITERS AND RELATED EQUIPMENT WITH THREE- AND FOUR-YEAR-OLD CHILDREN AT THE NEW NURSERY SCHOOL

INTRODUCTION

At the New Nursery School in Greeley, Colorado, three- and four-year-old environmentally deprived children are typing words and stories; at least part of their achievement can be attributed to the fact that they spend up to twenty minutes a day playing in a responsive environment booth with an electric typewriter, a *Language Master* and tape recorder. This is a part of an experimental program at the research and demonstration school that is trying to find new approaches to help each child enter school with a reasonable chance of success instead of entering with a predisposition towards failure.

All of the children who attend the New Nursery School are environmentally deprived; that is, they come impoverished; the average educational achievement of the parents is the sixth grade; the unemployment rate or only part-time employment is high; 26 per cent of the homes have only one parent present. The school dropout rate for older brothers and sisters is high and so is the rate of delinquent behavior. Most of the children are Mexican-American which compounds the problem because they are discriminated against, they have language problems and a different culture. Over the past three years, the mean IQ test scores on a Stanford-Binet were in the 80's. This, of course, is not a fair measure of the child's ability but it is a good predictor of his school success unless something intervenes to alter the prediction.

We intend to help the child form a positive self-image, improve the use of his senses and his perceptions, enhance his understanding and use of language, develop conceptual and problem-solving ability. To accomplish these ends instead of forcing the child to respond to the environment in a set pattern, we have developed an environment which responds to the child. The teacher and her assistants encourage free-play and free-exploration. We designed the school so that all activities are *autotelic;* that is, the child does something for its own sake rather than for the sake of obtaining rewards or avoiding punishments that have no inherent connection with the activity itself. Since we have not included anything in the environment that does not have a useful purpose, a child is allowed to pursue an activity as long as he likes and move on to another activity of his own choosing as often as he likes.

Most of a child's three hours in school is spent in self-directed activities such as painting, working puzzles, looking through books, dressing up, building with blocks, and a host of other activities.

About fifteen minutes a day are devoted to group activities such as singing, listening to a story, or participating in a planned lesson. A child does not have to take part in group activities if he does not want to.

ACTIVITIES IN THE TYPING BOOTHS

Once each school day a booth assistant asks a child if he would like to play with the typewriter. If he says "Yes," the assistant takes him to one of two booths equipped with an electric typewriter with different colored keys. The child is allowed to play with the typewriter for as long as twenty minutes. Before the child enters the booth, the assistant paints the child's fingernails to match the colors of the typewriter keys. When the child discovers the relationship of the colors, he will have learned the accepted fingering system for typing. In the meantime, the child begins in the booth by simply playing with the typewriter. The assistant answers his questions and names the symbols he strikes, such as, "x", "a", "y", "space", and "return". The child will move from this first phase to finding and striking a letter that is shown to him.

From there he progresses in a series of steps to typing words and then stories. Since this experimental work has implication for kindergartens and work with mentally retarded children, this article will expand upon the activities in autotelic responsive environment booths.

The autotelic responsive environment technique was developed by Omar Khayyam Moore who started his experimental work using electric typewriters and went on to develop the "talking typewriter", a form of a computer with a typewriter key board that can respond automatically to a child and can be programmed to perform a variety of other tasks. Our booths are modeled after Moore's but we have continued to use the conventional typewriter rather than the "talking typewriter" because of the cost (a $1,000 to $1,500 in capital outlay compared to approximately $30,000) and the difficulties involved in using and maintaining complex equipment in non-metropolitan areas.

A responsive environment as Moore has defined it has the following characteristics:

1. It permits the learner to explore freely;

2. It informs the learner immediately about the consequences of his actions;

3. It is self-pacing with events happening at a rate determined by the learner;

4. It permits the learner to make full use of his capacity for discovering relations of various kinds; and

5. Its structure is such that the learner is likely to make a series of inter-connected discoveries about the physical, cultural, or social world.

The implication of these characteristics will become more obvious as we describe the process. The first thing that usually attracts an observer's attention is the language development that takes place in the typing booths. Some children have learned to read in a relatively short period of time as a result of their experience in the booths, but, while we do not discount the importance of language development, our primary concern is with the mental process involved in discovering the association of sounds with symbols or the rules for a new game as we move from one place to another. We also think it is important to help young children develop a mental set that encourages problem-solving behavior rather than seeking some kind of reinforcement from an adult or peer before attempting something new in a novel situation.

As we mentioned earlier, a child is asked once a day if he would like to type. The following rules have been established to guide the behavior of the booth assistants and the children while they are in the booths.

The rules for the child are:

1. Say to the child, "Now it is your turn to play with the typewriter."

2. He need not come to the booth if he refuses.

3. He can leave whenever he wishes.

4. He must leave when his time is up (20 minutes maximum stay).

5. He need not explain his coming or going.

6. He goes to the booth to which he is assigned for the day.

7. If he says he wants to leave, or starts to leave, he may come back again the next day, but not the same day.

The rules for the booth assistants are:

1. A child is asked only once a day to come to the booth; if, after refusing, the child later asks to come, he is allowed to do so.

2. He is never asked to come to the booth if he is obviously involved in another activity.

3. The booth assistant is a part of the responsive environment and only responds to the child; that is, he answers questions, announces letters as the child strikes them, etc. The assistant should be friendly and responsive, but does not direct nor teach the child. The child is allowed to discover and learn for himself.

4. The only punishment used in the booth is to say, "I'm sorry, your time is up": at which time the child is taken back to the main room.

The activities in the booths move through four phases.

Phase I is free exploration; that is, the child plays with the typewriter and the booth assistant tells him what he is doing and the typewriter shows him the consequences of his acts.

As the child strikes the letters and symbols, the assistant names them. If the child hits more than one key at a time, the typewriter is turned off by means of an electric switch in a foot-pedal, the jammed keys are freed and the typewriter turned on again. If the child again hits several keys at once, the same procedure is followed, but the typewriter is turned off as soon as the child begins to strike more than one key at a time. Thus, the first thing the child discovers is that the typewriter only works when he strikes one key at a time.

The first time the carriage reaches the right hand margin, the child probably will not know how to return it. After allowing some time for the child to explore, the booth assistant presses the return key and says, "See what happens when I press this?" After this first demonstration, the typewriter is turned off when the carriage reaches the end until the child presses the return key, so that he will make his second discovery.

As far as the child is concerned, he is not learning the names of the letters, numbers, and punctuation marks. He is learning to associate abstract symbols and sounds. He will probably react to "A", "X", "5", and "question mark" in the same way and learn the name "question mark" as easily as "A" or "B".

The child will indicate in one way or another when it is time to move to the next phase. Some children will name the letter or number before the booth assistant does. Others will start to loose interest and the time they spend in the booth will decrease.

When a child loses interest, he quickly turns to something else. Some begin talking to the booth assistant about topics which may range from Batman to daddy's being in jail. One little girl created a make believe world playing house--the booth assistant being mommy. If a child initiates a conversation in the booth, the booth assistant responds. We want to encourage child-initiated conversation wherever it occurs.

PS 001 56

Phase II is called "Search and Match."

To introduce a child to phase two, the booth assistant displays the magnetic chalkboard with the overlay of the chart showing the typewriter keyboard. The typewriter is locked in upper case; the booth assistant selects one of the upper case plastic letters which have magnets in them, says the name of the letter as he places the letter on the magnetic chalkboard over the colored circle that corresponds to the color and placement of the letter on the typewriter. The child is not told he is beginning a new phase or playing a new game. He will discover this for himself.

If he asks what the chart is, the assistant says, "It's part of a new game"; it he points to the letter, the assistant names the letter, but the assistant lets him discover what the new game is and what the rules are. Of course, the game is for him to find the letter on the keyboard that is the same as the one on the chart and strike it; when he does, the typewriter works.

The child may try many things to make the typewriter work: some children begin an extended exploration of the typewriter, looking under it, behind, around, and inside it. Others seem to think like some housewives and believe they can make the typewriter work by banging it. Still other children behave like college freshmen striking keys at random, apparently hoping to find the right answer by chance, but some children will systematically touch every key until the typewriter works. A few study the keyboard not touching anything until they see the correct letter and then, with apparent elation, strike that key. These few have obviously discovered the rules to the game, and the others will in time. So far all of the children who have reached this phase have made this discovery without aid from the booth assistant. After the child has found the first letter, the assistant places another one on the chart and repeats the process.

When the child can match all the letters and symbols, or begins to lose interest in the game, it is time to move to the next step of phase two. To begin this step the assistant uses a secretary's Riteline and a roll of paper with the upper case letters printed on the paper so that only one letter at a time is displayed. The rule of the game is to find the letter that is displayed. After the child discovers the rules of the game and has gone through the roll of upper case letters, the next roll displays an arrow pointing upward plus two upper case letters (↑AC). The ↑ is the symbol we use for the upper case lock key of the typewriter. To start with the typewriter is not locked in upper case so the child must strike upper case, A and B. The booth assistant says, "upper case, A, B." The next roll presents ↑C ↓c. The arrow pointing downward is on the lower case shift key so the child is not discovering the concept of upper and lower case letters. We start with those letters that look similar in upper and lower case like C and c, K and k and proceed to those that look quite different like A and a, E and e.

During this step, the child should spend about one day out of five, or longer if he likes, playing games at the chalkboard. The first game is based upon the Alphabet Cards. The booth assistant writes the letters on the chalkboard as they appear on a set of cards with four upper case letters spaced across the top of the board and the same four letters in lower case along the bottom of the board, but in a different order. On the first set of fourteen cards, three of the four letters have similar shapes for the upper and lower case.

After the assistant has written the letters on the board, he gives the child the chalk and asks him to draw a line from upper case "C" to lower case "c" (if necessary, the assistant illustrates what he wants the child to do), from upper case "V" to lower case "v", from upper case "W" to lower case "w", and from upper case "R" to lower case "r".

This accomplishes three objectives: (1) the child learns the different forms of the same letter, (2) he discovers these differences for himself but is *aided* in making the right choice, and (3) he learns to solve a problem (what goes with R) by the process of elimination.

Using the first set of cards the booth assistant will not know when the child can recognize the upper and lower case of the same letter, because he can arrive at the correct answer by eliminating the wrong onces. After completing the first set of cards, the assistant uses another set. These seven cards have two letters with similar upper and lower case forms and two letters with dissimilar upper and lower case forms. If the child has difficulty in associating the different forms of the same letter, the assistant then goes back to the first set. After the child can make the correct associations on the second set of cards, the assistant uses still another set on which all the letters have different upper and lower case forms.

Phase IV starts when the booth assistant asks the child if he would like to type a word. The usual response is "yes". Sometimes a child doesn't know what a word is. In that case we help him understand what "word" means, by giving him examples using his name and familiar objects in the room. The assistant then asks, "What word would you like to type?" The important thing at this point is that the words are important to the child. If the words are important to the child, he will remember them. The first child who reached this phase chose Volks, Rambler, and Dr. Nimnicht. Then he looked around the room and chose window and door. The next day he recognized the first three--they were important--the family had just gotten a Volkswagen to replace a Rambler and Dr. Nimnicht was the booth assistant but he had forgotten door and window so those two words were discarded. The procedure is to ask the child what word he would like to type, print it on a *language Master* card, record the word on the card, and then let the child type the word using upper and lower case letters as they are appropriate. The next day the assistant shows the words to the child and asks him to say them.

When the child knows fifteen or twenty words, he is ready for the next phase - writing a story. The booth assistant asks, "Would you like to tell a story using your words?" As the child tells the story, the booth assistant takes it down and records it on the tape recorder. Then the assistant types the story for the child. The next step is to have the child type his own story, putting to use all he has learned. If, for example, he forgets to start a sentence with an upper case letter, the typewriter stops. But because he has had this experience before, he knows why it stopped and corrects his mistake. We try to take down the stories as the child says them, altering them as little as possible in transcribing. But we do substitute the correct word such as "because" for "pick us" and "can" for "kand."

PROBLEMS IN EVALUATION

Measuring the effectiveness of this aspect of the New Nursery School Program is difficult for the following reasons:

1. Time spent by a child in a booth with a typewriter accounts for a small fraction of the total time he is in school.

2. It is difficult to establish a firm baseline from which to measure IQ tests for three- and four-year-olds are not highly reliable at their best, and are even less reliable with environmentally deprived children. Each year, up to 20 per cent of the children cannot be tested; some are too withdrawn and others probably are below the threshold of the test. We can't be sure which.

3. We also run into language problems; some children speak only English, others only Spanish. Most speak some of each, but often they do not have a usable language for purposes of accurate IQ assessment when they enter our school. Each year, one or two out of 30 have no language beyond a few nouns and pronouns. Such a child might say, "milk," "cookies," or "Eee-ah he-ee-ee me-ee-ee br-r-r" (sounds and gestures like a truck), which means "Elias hit me with a truck." While we have attempted assessment and collected some data, it is difficult to evaluate test results when confronted with these problems.

DATA COLLECTED

For each child a record was maintained which showed the number or times he was asked if he would like to type, the number of times he did type, the number of minutes he spent when he typed, and the number of strokes he typed. In addition, each day the booth assistants wrote a report on the child's activities in the booth. By numbering the levels of achievement from one (for free exploration), two (for matching upper case letters), three (matching upper and lower case letters), four (typing words), and five (dictating stories) we have an approximation of the child's achievement in the booths. For the deprived children who are attending the New Nursery School the data from the booths cover a three-year period of time, and for the middle class children who attend the REN school, the data cover only the 1966-67 school year.

Table I shows the achievement of the NNS children over a three-year period of time. Since we have three-year-old children in the school (NNS 3), four-year-old children who are attending the school for their first year (NNS 4-1) and, after the first year, four-year-old children who are attending the school for the second year (NNS 4-2), it was necessary to separate the data for these sub-groups. From inspecting a table on this, it appears that as we have gained experience and improved our procedures and techniques, the booth achievement of the children has improved. (This means, however, we cannot combine all of the NNS 3's, NNS 4-1's, or NNS 4-2's in our analysis. On the contrary, we must treat them as separate groups.) We have not made extensive use of statistical analysis because the number of cases included is small and in many instances it is questionable whether or not the assumptions underlying the tests have been met. In the instances where statistics have been used, the only purpose is to give the reader some basis for judging the magnitude of the relationship or the probability that a significant difference does exist.

ANALYSIS OF THE DATA

As a basis for analyzing the data we posed a number of questions.

1. Is there any relationship between the number of times a child wants to type, the total time he spent in the booths, and his achievement in the booths?

The answer is yes. Tables II and III show the inter-correlations for the NNS and REN children who attended the school during the 1966-67 school year. All of the correlations are significant.

2. Is there any relationship between age and achievement in the booth?

These data are shown in Table IV. It appears that there is a difference between the three- and four-year-old children on three successive years, four-year-old children more often reach the more complicated phase of achievement than do three-year-olds, so we can conclude that age is related to achievement in the booths.

Furthermore, looking back at Table I for 1965-66, 30 per cent of the NNS 4-1's were typing words or stories compared to 21 per cent of the NNS 4-2's. In 1966-67, 20 per cent of the NNS 4-1's were typing words and stories compared to 43 per cent of the NNS 4-2's. This may mean that we are improving the efficacy of the booth activities or that the booth experience for the deprived child who is only three years old makes no substantial contribution to his achievement in the booths when he is four. Of the six children who were typing words or stories during the 1965-66 year, three were in their first year and three in their second year. Of the five children with comparable IQ scores who did not achieve as well in the booths, four were in their second year. During the 1966-67 school year, three out of six high booth achievers (expressed in phase number) were in their first year and three in their second year; the low booth achiever's group had the same distribution (3 and 3). These facts reinforce the conclusion that the booth experience for three-year-olds does not make a significant contribution to their later achievement as we measure it. We do not know what the long range effects may be.

3. Is there any relationship between the IQ Test score on the Stanford-Binet and achievement in the typing booths?

Examining the data in Table V it would appear that there is a positive relationship between IQ scores and booth achievement. We used the Kruskal-Wallis One-Way Analysis of Variance to check this possibility. The first procedure was to rank order the children based on the IQ scores. The next procedure was to sum the ranks under each level of achievement. To make the data more understandable at this point we divided the R's (sums of ranks) by N to obtain a mean rank for each level of achievement. The null-hypothesis was that there would be no significant differences in the ranking from one achievement level to another.

TABLE I

Booth Achievement of New Nursery School Children
Over a Three Year Period

	Year	Levels of Achievement in the Booths									
		1		2		3		4		5	
		No.	%	No.	%	No.	%	No.	%	No.	%
NNS 3	1964-65	3	27	6	55	2	18				
	1965-66	4	50	4	50						
	1966-67	1	4	14	56	10	40				
NNS 4-1	1964-65	4	27	5	33	3	20	2	13	1	7
	1965-66	2	20	5	50			1	10	2	20
	1966-67			7	47	5	33	3	20		
NNS 4-2	1965-66	1	7	9	64	1	7	1	7	2	14
	1966-67			2	29	2	29	1	14	2	29

TABLE II

Correlations on Booth Data for NNS (1966-67)

N=47

	Phase number	Stroke Count	Number times in Booth
Total Booth Time	.65	.56	.76
Phase number		.42	.30
Stroke Count			.41

TABLE III

Correlations on Booth Data for REN (1966-67)

N=32

	Phase number	Stroke Count	Number times in Booth
Total Booth Time	.48	.72	.82
Phase number		.25	.35
Stroke Count			.60

TABLE IV

The Relationship of Age and Achievement in the Typing Booths.

		Phase Number									
		1		2		3		4		5	
		No.	%	No.	%	No.	%	No.	%	No.	%
1964-65	NNS 3's	3	27	6	55	2	18				
	NNS 4-1's	4	27	5	33	3	20	2	13	1	7
1965-66	NNS 3's	4	50	4	50						
	NNS 4-1's	2	20	5	50			1	10	2	20
1966-67	NNS 3's	1	4	14	56	10	40				
	NNS 4-1's			7	47	5	33	3	20		

TABLE V

THE RELATIONSHIP OF IQ TEST SCORES ON THE STANFORD-BINET AND LEVELS OF ACHIEVEMENT IN THE TYPING BOOTHS

	N	R_1	M	N	R_2	M	N	R_3	M	N	R_4	M
1964-65												
NNS 3	2	6	3	5	27	5	2	12	6	--	--	--
NNS 4-1	3	7	2	4	32	8	3	20	7	3	32	11*
1965-66												
NNS 3	3	10	3	4	19	5	--	--	--	--	--	--
NNS 4-1	1	1	1	4	14	4	--	--	--	2	13	7
NNS 4-2	1	3	3	9	67.5	8	1	4	4	3	30.5	10
1966-67												
NNS 3	--	--	--	8	52.5	7	6	52.5	8			
NNS 4-1	--	--	--	7	45.5	7	5	47.5	10	3	27	9
NNS 4-2	--	--	--	2	5.5	3	2	11.5	6	3	11	4
REN 3	--	--	--	1	1	3	3	9	3	1	5	5
REN 4	1	1	3	--	--	--	6	29.5	5	5	46	9

N = Number
R = Sum of ranks of test scores
M = Mean of scores of ranks

* Significant at .10 level

If a positive relationship does exist, the mean of the R's should increase from level one to level four and five. By observation one can see that if any significant differences exist they are in a positive direction, but the relationship certainly is not very significant. In only one instance (1964-65 NNS 4-1's) did it reach the .10 level, meaning that this difference could occur by chance alone one out of ten times.

We tested this relationship another way by distributing IQ test scores for four-year-olds into two groups; those who were typing words and stories at the end of the year (high booth achievers) and those who were not (low booth achievers). Looking at Table VI the significant difference is obvious but it also is apparent that not all of the children who score high on the IQ test have high achievement in the booths. In three years, however, only one four-year-old child with a beginning IQ score of below 90 has reached the point of typing words in the booths and in three years of our project, no NNS child who was three years old at the beginning of the year reached the point of typing words by the end of that school year.

A reasonable conclusion seems to be that there is a relationship between IQ test scores and booth achievement such that children with low IQ's are not likely to be high achievers in the booths--95 per cent were not. On the other hand, having an average or above IQ score does not predict booth achievement; only 36 per cent of this group reached the point of typing words. So intelligence test scores alone (when the age spread is limited to one year--four years at the time the child entered the school) is not a good predictor of success in the booths.

4. Is there any relationship between the achievement in the booths and language development or concept formation?

From one point of view the children have obviously made advances in language developments as a result of their experience in the learning booths. At the end of the 1966-67 school year all of the children who were four at the beginning of the school year could match some of the upper case letters on the keyboard with other forms of the letter, 71 per cent could match upper and lower case letters, 43 per cent could type some words and recognize those words, and 29 per cent had a sight vocabulary of fifteen to twenty words and were dictating stories to the booth assistant using these words. It is unlikely that any of these children could have done any of these things without this experience or something comparable to it. The relationship of these accomplishments to future language developments remains open to speculation.

At this point in the analysis the difficulties we mentioned earlier become more apparent. There is a relationship between age and achievement, and some relationship of IQ scores and performance in the booths. We cannot isolate the effect of the booth experience on achievement from the effect of the rest of the room. However, one can reason that the operation of the booth required considerable time and effort. Therefore, they should make a substantial contribution to the achievement of the child to justify this time and effort so the magnitude of the change should be great enough to offset gains the children could have made if they had not gone to the booths.

TABLE VI

The Distribution of IQ Scores on the Stanford-Binet
for High (Phase IV or >) and Low (Phase III or <) Booth Achievers

	Below 80	80-84	85-89	90-94	95-99	100-104	105-107	110-up
High Achievers	1			5	2	1	4	1
Low Achievers	8	7	5	3	10	5	4	

Therefore, those children who achieved the most in the booths should do significantly better on tests of language development and concept formation than a comparable group of children with lower booth achievement. To test this we controlled age by comparing only four-year-olds and we took all of the children who were typing words or stories and compared their achievement on tests to a group who did equally well on the Stanford-Binet but were not typing words and stories, thereby control for initial IQ scores.

Of the group of children who entered kindergarten in September, 1966, five were typing words or stories. They had a mean IQ score of 104.6 (range 101 to 109). The five children chosen for comparison had a mean IQ score of 104.5 (range 103 to 107). The post test scores were: high achievers in the booths mean IQ 99.4 (range 91 to 123); low achievers mean IQ 96.0 (range 89 to 107).

The distribution of their test scores on the Metropolitan Reading Readiness Test taken at the end of their school year in kindergarten is shown in Table VII. There is a significant difference between the high achievers and low achievers in the booth on arithmetic readiness scores and total readiness scores on the Metropolitan Test and possibly a difference on reading readiness.

Out of the group of four-year-old children who were in the New Nursery School during the 1966-67 school year, six were typing words or stories at the end of the year. Their mean IQ test score at the beginning of the year on the Stanford-Binet was 90.7 (range 75 to 99). The six children with low achievements in the booths with the highest IQ scores had a mean IQ score of 99 (range 95 to 105) so, if there is a difference in IQ score, it favors the low achievers. We do not have post IQ score on this group at this time. We have test scores for both groups on the "C" Test, a test of the ability of a child to relate objects that belong in the same category, on the Pre-School Inventory, the Cincinnati Autonomy Test Battery, which includes tests of curiosity, impulse control, incidental learning, intentional learning, innovative behavior, and an embedded figures test, and a categories test designed to test the child's ability to discover logical categories. There were no apparent differences between the two groups on the Pre-School Inventory, or any test in the Cincinnati Autonomy Test Battery, but a significant difference favoring the high achievers on the "C" Test. Table VIII shows the distribution of the scores on that test.

Judging from the results on the Metropolitan Reading Readiness Test for one group and the "C" Test for another group, the children with the highest achievement in the booths seem to be doing better on tests of language development and concept formation than comparable children with lower achievement in the booths, but this is a very tenuous conclusion at this time.

5. How does the performance of the NNS children compare to the REN children?

Because of delays in receiving the equipment, we did not open the booth at the REN school until January, 1967, and since the parents of the REN children paid tuition they choose to send their children only two or three days a week. As a result, the booth

TABLE VII

Comparison of Test Scores on Metropolitan Reading Readiness Test For Children with High Achievement and Low Achievement in Typing Booths

	Reading Readiness				
	Below 50	50-54	55-59	60-64	
High Booth Achievement			3	2	
Low Booth Achievement	1	2	1	1	

Arithmetic Readiness

	10-11-12	13-14-15	16-17-18	19-20-21	22-23-24
High Achievement			3		2
Low Achievement	1	4			

Total Readiness

	60-69	70-79	80-89	90-100	
High Achievement			3	2	
Low Achievement	3	1	1		

Reading Readiness $x^2 = 3.6$ not sig.

Arithmetic Readiness $x^2 = 10.0$ sig. .01

Total Readiness $x^2 = 6.4$ sig. .05

assistant had less opportunity to ask REN children to come to the booth. The NNS children went to the booth on the average of 60 times and remained an average of 12 minutes and the REN children went to the booths on the average of 20 times and remained an average of 18 minutes. Table IX shows the achievement of the two groups.

When one considers the fact that the REN children went to the booths only one-third as many times as the NNS children, the difference in the achievement of the two groups is even more significant than it appears.

The one REN three-year-old child who was typing words at the end of the year had an IQ test score of 132. Table X shows the distribution of IQ scores for the REN children who were typing words or stories and the lower booth achievers. There is an obvious difference between the two groups. Since it is not possible to match a group of high and low achievers, no future analysis of the data was made for this group. The same pattern, however, exists for this group that existed in the NNS group.

6. Is there any relationship between achievement in the booths and problem solving ability?

At this time we do not have the data available to start to answer this question and it will be at least a year before we will have any data on this subject.

DISCUSSION

There is a relationship between the number of times the children go to the booth, the amount of time they spend and achievement in the booth. There is also a relationship between age and booth achievement, and IQ scores and booth achievement.

Judging from our findings to date, the booth experience seems to be of little worth for three-year-old deprived children. In fact, if this experience does have value it may be that it is more effective with older children or with four-year-old children who have IQ scores of average or better. In any event, it is too early in the project to make even tentative recommendations.

This year (1967-68) we are dividing the three-year-old children into matched groups. One group will have the learning booth experience as it has been described and the other group will have a non-language experience in its place. The following year both groups will have the booth experience. This is a start towards answering the question about the worth of this experience for three year olds. We are also experimenting with problem solving tests and, of course, our follow-up data on school experience will add to the evaluation.

TABLE VIII

The Distribution of Test Scores on the "C" Test
For High and Low Achievers in the Typing Booths

	1-2	3-4	5-6	7-8	9-10
High Achievers			4	1	1
Low Achievers[x]	2	2		1	

x one child did not take the "C" Test

x^2 value was 6.98 with 2 df (7.05) using the Kolmogorov-Smirnov Two Sample Test

TABLE IX

The Booth Achievement of NNS and REN Children
At the End of the School Year 1966-67

	Achievement in Booth									
Group	1		2		3		4		5	
NNS 3	1	4%	14	56%	10	40%				
NNS 4-1			7	47%	5	33%	3	20%		
NNS 4-2			2	29%	2	29%	1	14%	2	29%
REN 3	1	13%	2	25%	4	50%	1	13%		
REN 4-1	2	10%	5	24%	7	33%	4	19%	3	14%
REN 4-2			1	20%	1	20%			3	60%

TABLE X

High and Low Achieving REN Children

The Distribution of IQ Scores

	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130 Up
High A				1		1	1		2
Low A	2	2	1		2	1	2		